

WHAT IS CLAIMED IS:

1. A solid state image device comprising:

a gate insulator film formed on a semiconductor

5 substrate;

a first gate electrode, formed on said gate insulator film, having a substantially flat upper surface; and

10 a second gate electrode formed on said gate insulator film through an insulator film having a thickness smaller than the minimum limit dimension of lithography to be adjacent to said first gate electrode without overlapping said first gate electrode.

2. The solid state image device according to claim 1,

15 wherein

said insulator film includes a thermal oxide film.

3. The solid state image device according to claim 1,

wherein

20 said second gate electrode has a substantially flat upper surface.

4. The solid state image device according to claim 3,

wherein

25 the upper surfaces of said first gate electrode and

5           said second gate electrode are substantially flush with  
each other.

10           5       5. The solid state image device according to claim 4,  
wherein

15           the upper surface of said insulator film is  
substantially flush with the upper surfaces of said first  
gate electrode and said second gate electrode.

20           10       6. The solid state image device according to claim 1,  
wherein

25           said gate insulator film includes an insulator film  
at least partially having an oxidation inhibiting function.

30           15       7. The solid state image device according to claim 1,  
wherein

35           said gate insulator film includes a first gate  
insulator film and a second gate insulator film formed on  
said first gate insulator film.

40           20       8. The solid state image device according to claim 7,  
wherein

45           at least either said first gate insulator film or  
said second gate insulator film has an oxidation  
25        inhibiting function.

9. A method of fabricating a solid state image device, comprising steps of:

5 forming a gate insulator film on a semiconductor substrate;

forming a plurality of first gate electrodes having substantially flat upper surfaces on said gate insulator film at a prescribed interval;

10 forming insulator films on the side surfaces of said first gate electrodes; and

15 forming a second gate electrode adjacent to said first gate electrodes without overlapping said first gate electrodes through said insulator films by depositing a second gate electrode layer to fill up a region located between said first gate electrodes and thereafter removing an excess depositional portion of said second gate electrode layer by polishing.

20 10. The method of fabricating a solid state image device according to claim 9, wherein

25 said step of forming said second gate electrode includes a step of depositing said second gate electrode layer having a thickness substantially identical to the thickness of said first gate electrodes to fill up said region located between said first gate electrodes.

11. The method of fabricating a solid state image device according to claim 9, wherein

5        said step of forming said second gate electrode includes a step of forming said second gate electrode having a substantially flat upper surface by removing said excess depositional portion of said second gate electrode layer by polishing.

10        12. The method of fabricating a solid state image device according to claim 11, wherein

15        said step of forming said second gate electrode includes a step of forming said second gate electrode having an upper surface substantially flush with the upper surfaces of said first gate electrodes by removing said excess depositional portion of said second gate electrode layer by polishing.

20        13. The method of fabricating a solid state image device according to claim 9, further comprising a step of forming a polishing stopper film on said first gate electrodes in advance of said step of forming said second gate electrode, wherein

25        said step of forming said second gate electrode includes a step of forming said second gate electrode

adjacent to said first gate electrodes without overlapping said first gate electrodes through said insulator films by polishing said excess depositional portion of said second gate electrode layer through said polishing stopper film 5 serving as a stopper.

14. The method of fabricating a solid state image device according to claim 9, wherein

10 said step of forming said insulator films on the side surfaces of said first gate electrodes includes a step of forming thermal oxide films on the side surfaces of said first gate electrodes by thermally oxidizing the side surfaces of said first gate electrodes.

15 15. The method of fabricating a solid state image device according to claim 14, wherein

20 said step of forming said thermal oxide films includes a step of forming said thermal oxide films having a thickness smaller than the minimum limit dimension of lithography.

16. The method of fabricating a solid state image device according to claim 14, wherein

25 said step of forming said gate insulator film includes a step of forming said gate insulator film

including an insulator film at least partially having an oxidation inhibiting function.

17. The method of fabricating a solid state image

5 device according to claim 9, wherein

said step of forming said gate insulator film

includes steps of:

forming a first gate insulator film, and

forming a second gate insulator film on said first

10 gate insulator film.

18. The method of fabricating a solid state image

device according to claim 17, wherein

at least either said first gate insulator film or

15 said second gate insulator film has an oxidation

inhibiting function.

19. The method of fabricating a solid state image

device according to claim 9, further comprising a step of

20 forming an impurity region in a self-aligned manner on a

portion of said semiconductor substrate located under a

region formed with said second gate electrode by ion-

implanting an impurity into said semiconductor substrate

through at least said first gate electrodes serving as

25 masks in advance of said step of forming said second gate

electrode.

20. The method of fabricating a solid state image device according to claim 19, wherein

5           said step of forming said impurity region includes a step of ion-implanting said impurity into said semiconductor substrate through said first gate electrodes and said insulator films serving as masks.

10           21. The method of fabricating a solid state image device according to claim 19, wherein

              said step of forming said impurity region includes steps of:

15           forming a mask layer to partially cover said region formed with said second gate electrode, and  
              ion-implanting said impurity into said semiconductor substrate through said first gate electrodes and said mask layer serving as masks.